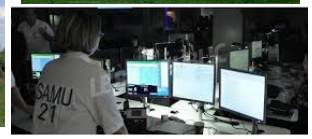
Prise en charge de la douleur thoracique aux urgences en France en 2024

Pr P. Ray
Département Universitaire de MU Dijon
CNBH 2024

Merci à Pr S. Charpentier et à Pr N; Peschanski et à Dr C. Chenevier-Gobeaux



Centre d'Enseignement des Soins d'Urgence 21

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UFR SCIENCES DE SANTÉ DIJON

COLLEGE NATIONAL DE BIOCHIMIE DES HÔPITAUX

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Jeudi 25 et vendredi 26 janvier 2024

hôtel Ibis Paris 17 Clichy-Batignolles

DECLARATION D'INTERET
DANS LE CADRE DE MISSIONS DE FORMATION
RÉALISÉES POUR LE CNBH

Pr RAY Patrick
Exerçant au CHU de Dijon, département Universitaire de Médecine d'urgence déclare sur l'honneur

ne pas avoir d'intérêt, direct ou indirect (financier), avec les entreprises pharmaceutiques, du diagnostic ou d'édition de logiciels susceptible de modifier mon jugement ou mes propos, **concernant le sujet et les DMDIV présentés**.

Citer ici les liens mentionnés sur la déclaration s'il en existe, sinon supprimer cette mention

PAS DE LIENS D'INTERET, MAIS…

EMERGENCY AND MASTER CLASS IN MONTE-CARLO

COMITÉ SCIENTIFIQUE

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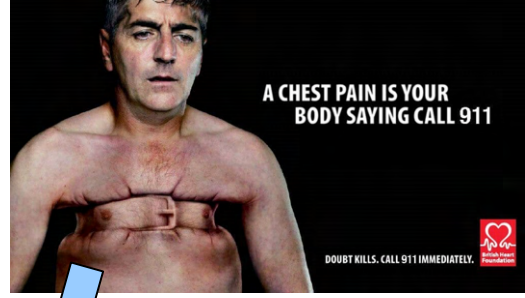
OBJECTIFS

- Organisation de la MU en France
- Organisation de la PEC d'une DT en France
- cTnHs et DT
- Intérêt et limites des algorithmes de la cTnHs
- Questions non résolues ?



VSAV

SMUR

Médecin

UMH-P/SEcours

CRRA 15/SAS

Conseil médical

Organisation de la MU en France

En régulation

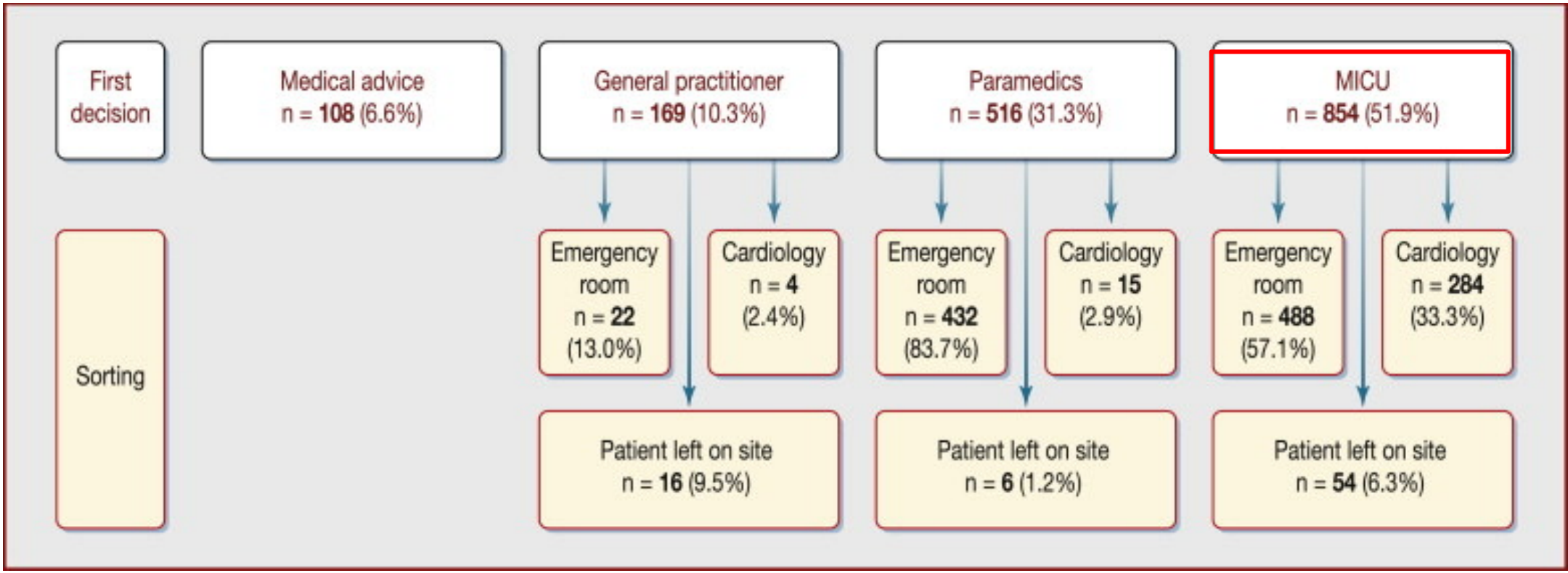
1. Qq FdR CV
2. Type de DT, timing
3. Sueurs (dyspnée+/-) associées
4. Patient.e directement au téléphone
5. « Ambiance » ?
6. Et plus d'info. selon l'appelant.e
7. Informations, conseils
8. SMUR ou VASV/ambulance ou MG, ou conseils ou…
9. Régulation < 2-3 min

1
1

Appels au 15

N = 1647

40% seulement où on interroge directement le patient



Median pain-to-call time :

55 [23-150] minutes for men vs. 79 [31-220] women minutes.

Manzo-Silberman, *ArchCardiovascularDis* 2015

Lapostolle *Emergencias* 2021

Interrogatoire du patient

Variables	Regression coefficient	OR	95% CI	*P*-value
Age, y				
< 40	0	1		
40–50	1.085	2.958	[1.668–5.246]	< 0.001
50–60	1.692	5.431	[3.125–9.439]	< 0.001
≥ 60	1.969	7.166	[4.162–12.336]	< 0.001
Tobacco use	0.359	1.432	[1.064–1.927]	0.018
Severe pain (NRS ≥ 6)	−1.016	0.362	[0.143–0.917]	0.032
Permanent pain	0.385	1.469	[1.09–1.981]	0.012
Breathing non-related pain	0.813	2.254	[1.281–3.967]	0.005
Retrosternal pain	0.457	1.580	[1.203–2.075]	0.001
Radiating pain	0.465	1.592	[1.209–2.097]	0.001
Additional symptoms	0.066	1.068	[0.735–1.551]	0.729
Severe pain* Breathing non-related	0.838	2.313	[1.015–5.271]	0.046
Severe pain*Additional symptoms	0.850	2.339	[1.202–4.553]	0.012

AUC = 0,76

Homme : performance des signes clinique classique, en régulation +++++

Variables	Regression coefficient	OR	95% CI	*P* value
Age ≥ 60 y	1.716	5.564	[3.160–9.800]	< 0.001
Personal history of coronary artery disease	0.603	1.828	[1.120–2.982]	0.016
Breathing non-related pain	1.017	2.765	[1.346–5.678]	0.006
Radiating pain	0.469	1.598	[1.017–2.513]	0.042

Femme : plus complexe ou « pas comme on nous apprend »
AUC insuffisante

Reuter, *Scand J of Trama an Emerg Med* 2019
Coisy *EurJEmergMed* 2024

Quelle priorisation du patient ?

Vous êtes posté à l'accueil des urgences.

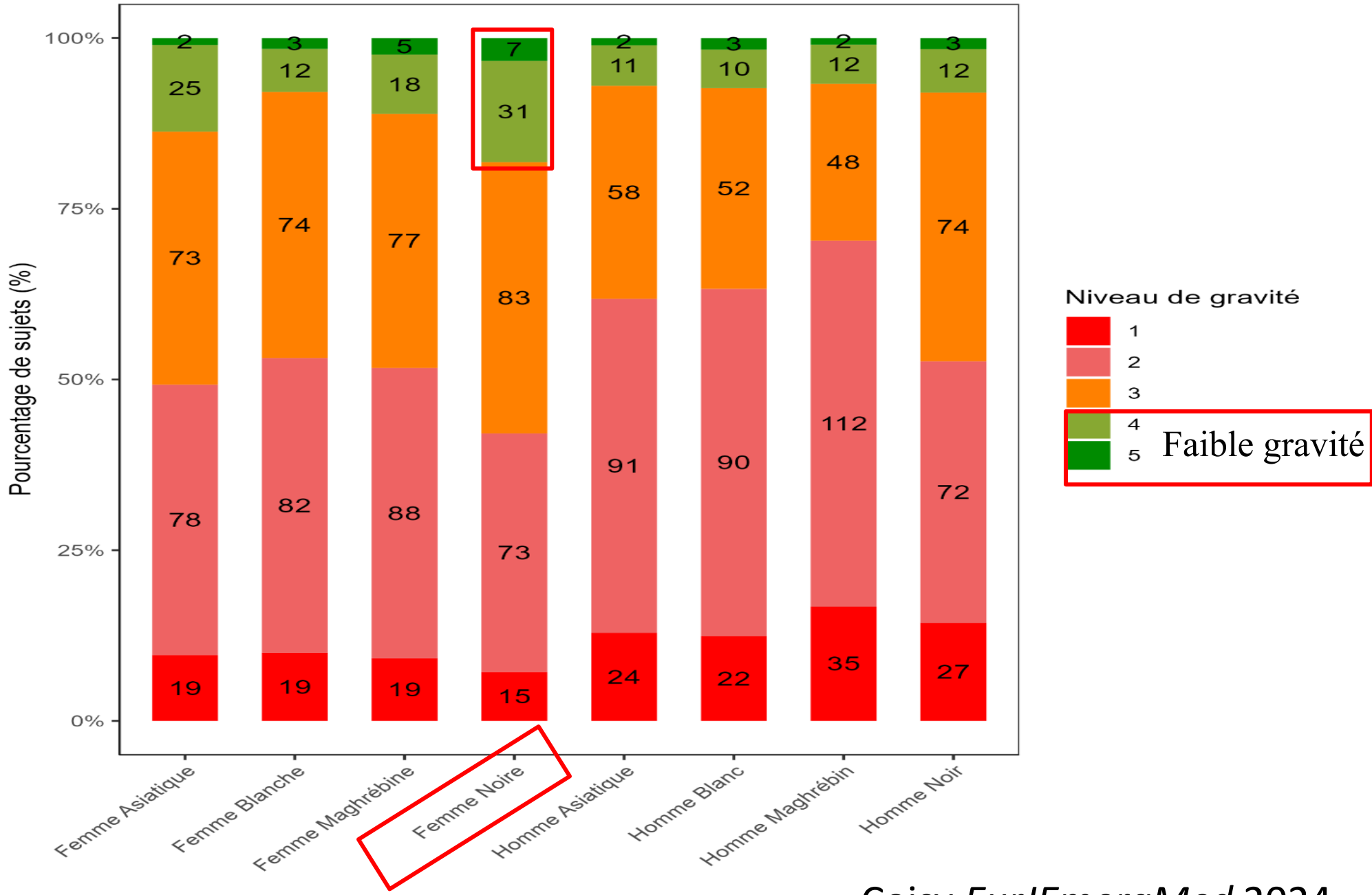
Le patient ci-dessus, âgé de 50ans est admis. Il rapporte depuis ce matin une douleur thoracique qu'il dit avoir du mal à décrire, mais qui semble dyspnéisante.

Il dit ne pas avoir fait d'effort, mais exprime un contexte d'anxiété lié à des problèmes familiaux (dispute avec son fils adolescent encore ce matin).

Il n'a comme antécédent personnel qu'un épisode dépressif majeur il y a deux ans. Il n'a pas d'antécédent familial connu.
Il ne prend pas de traitement.

Il déclare avoir fumé environ un demi-paquet de cigarette par jour pendant 12ans, sevré il y a 5ans.

Ses paramètres sont :
- PA : 135/75 mmHg
- FC : 83bpm
- SpO2 : 98% en AA
- FR : 16/min



Coisy *EurJEmergMed* 2024

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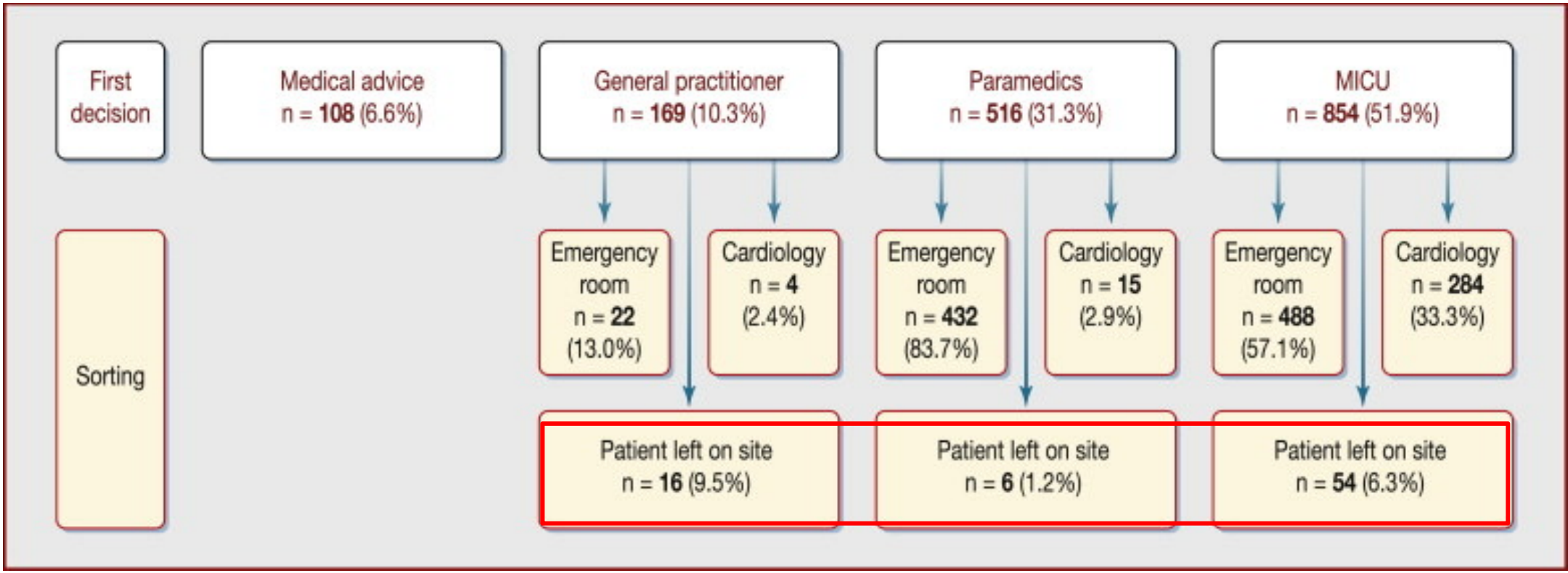


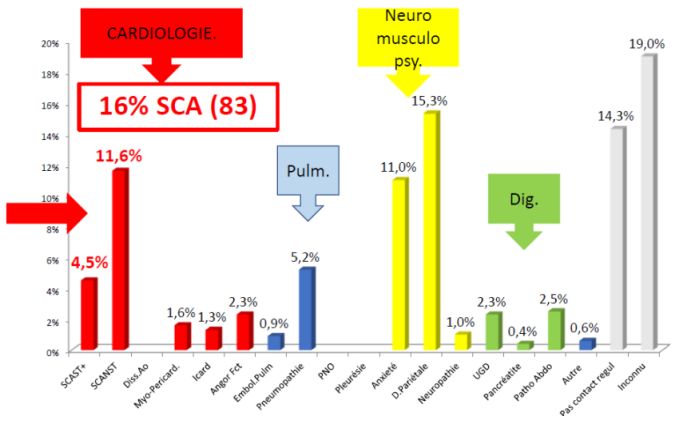
Les patients sont rarement laissés sur place

Manzo-Silberman, *ArchCardiovascularDis* 2015
Lapostolle *Emergencias* 2021

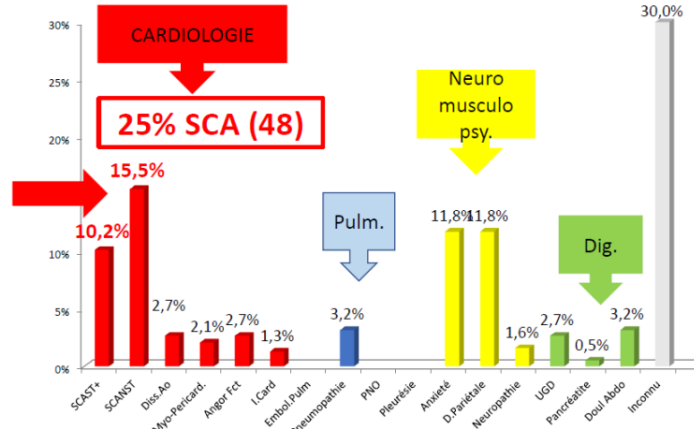
Le contexte

Pas la même épidémiologie – pas les même stratégies – pas les mêmes performances des outils

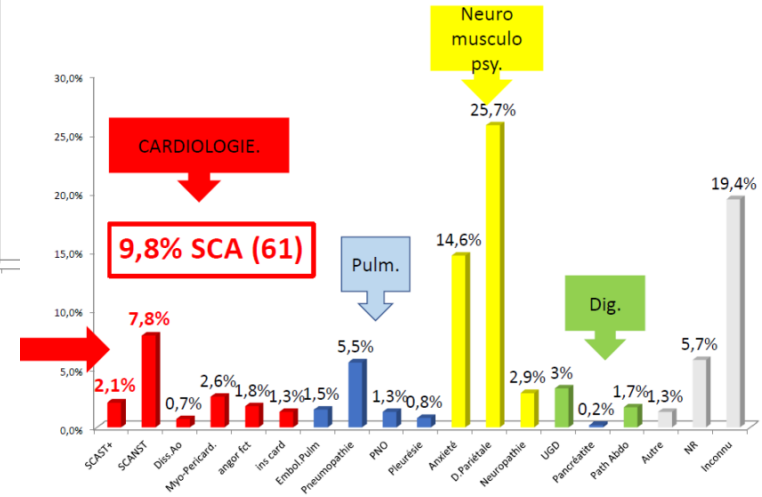
Epidémiologie à la régulation (537)



Epidémiologie en SMUR(187)



Epidémiologie aux urgences (615)



Charpentier, *EurJEmergM* 2017

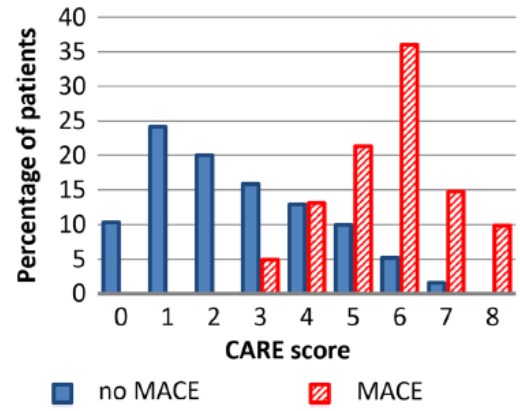
Aide de score clinique validé ?

Caractéristiques de la douleur	Typique	2
	A des éléments d'atypie	1
	Totalement atypique	0
Age	≥ 65 ans	2
	45 – 64 ans	1
	< 45 ans	0
facteurs de **R**isque	≥ 3 facteurs de risque	2
	1-2 facteurs de risque	1
	Pas de facteur de risque connu	0
ECG	Déviation significative du ST	2
	Autres anomalies aspécifiques	1
	Normal	0

Exclusion à l'admission

La règle CARE…

0-1 | 2-4 | 5-8



ig. 2 Percentage of patients with and without MACE

Moumneh *IntEmergMed* 2018

HEAR/CARE score < 2

On utilise des règles d'exclusion intégrant le caractère typique/atypique de la DT et les FdR CV… « qui sont dépassées »

OBJECTIFS

- Organisation de la MU en France
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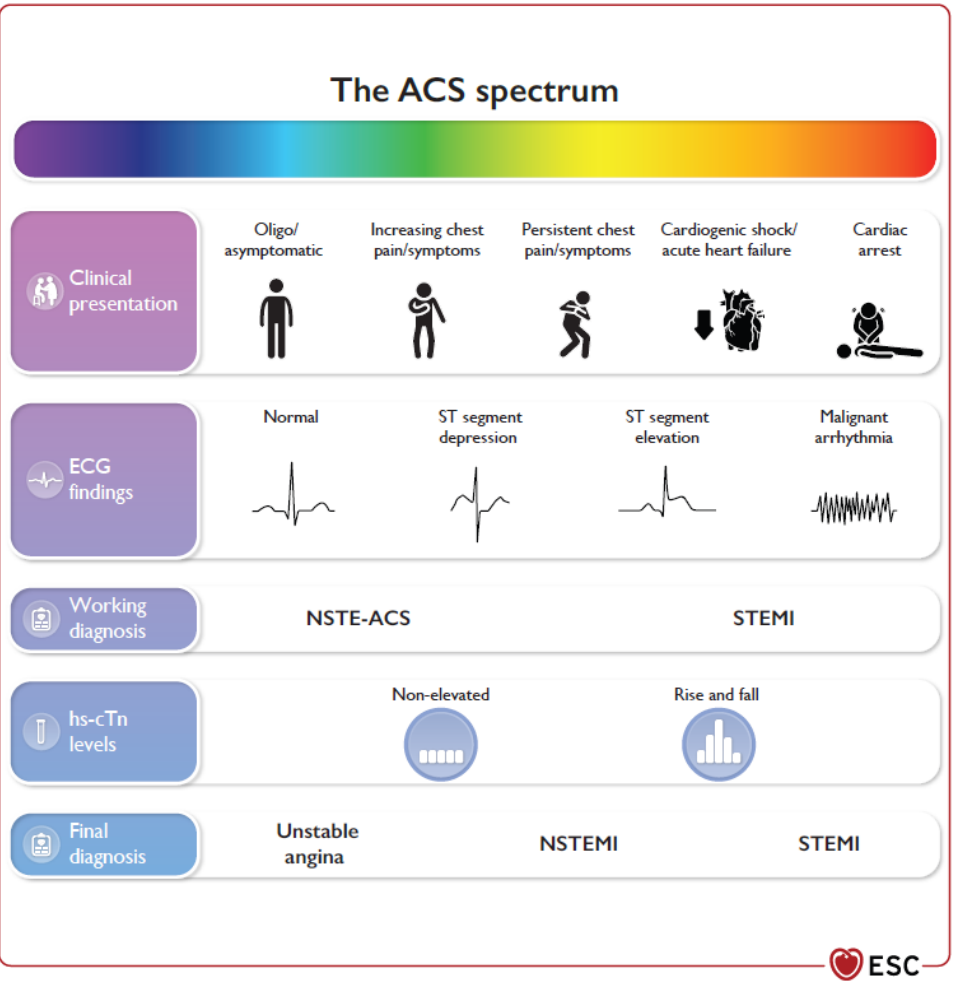
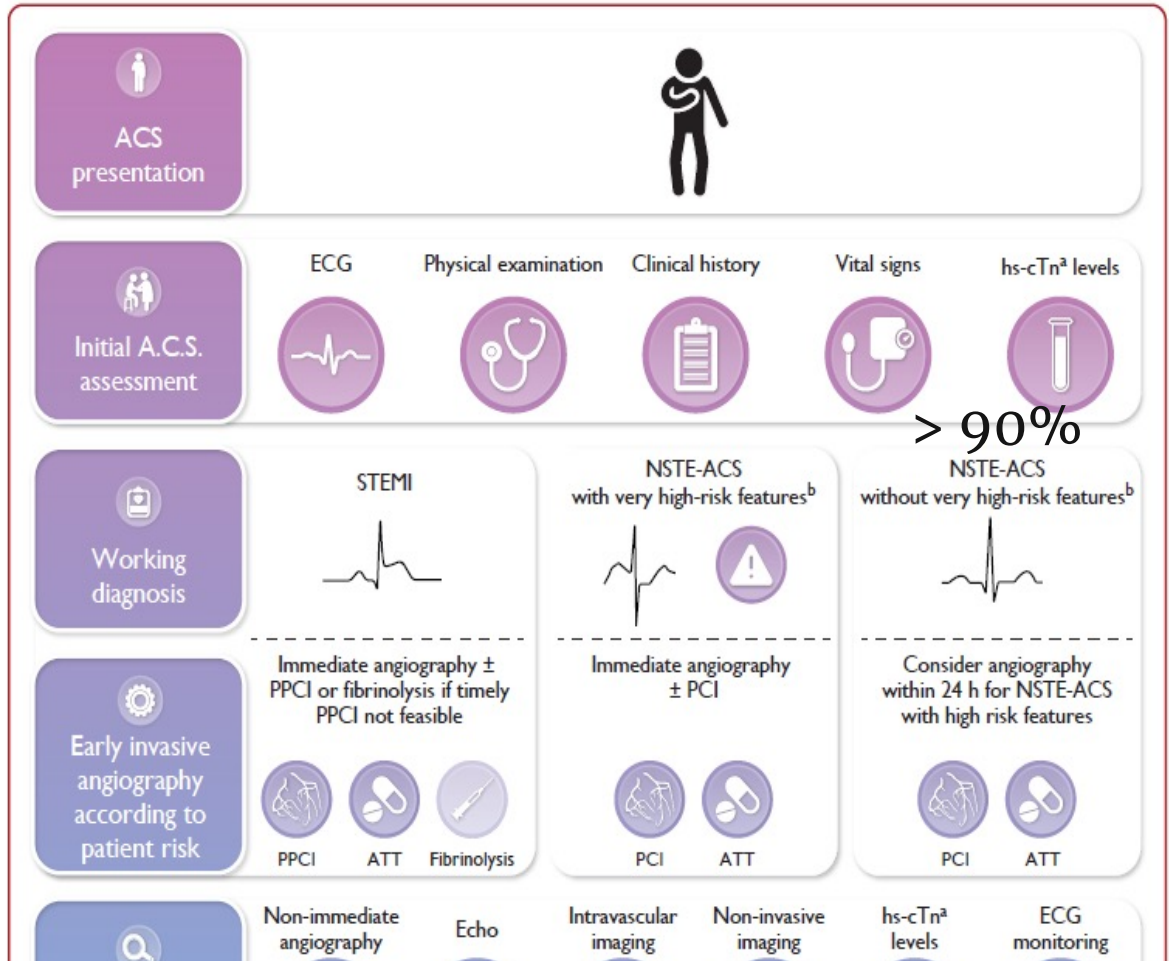
Rappels classiques sur SCA



ure 2 The spectrum of clinical presentations, electrocardiographic findings, and high-sensitivity cardiac troponin levels in patients with acute coronary drome. ACS, acute coronary syndrome; ECG, electrocardiogram; hs-cTn, high-sensitivity cardiac troponin; NSTE-ACS, non-ST-elevation acute coronary drome; NSTEMI, non-ST-elevation myocardial infarction; STEMI, ST-elevation myocardial infarction.



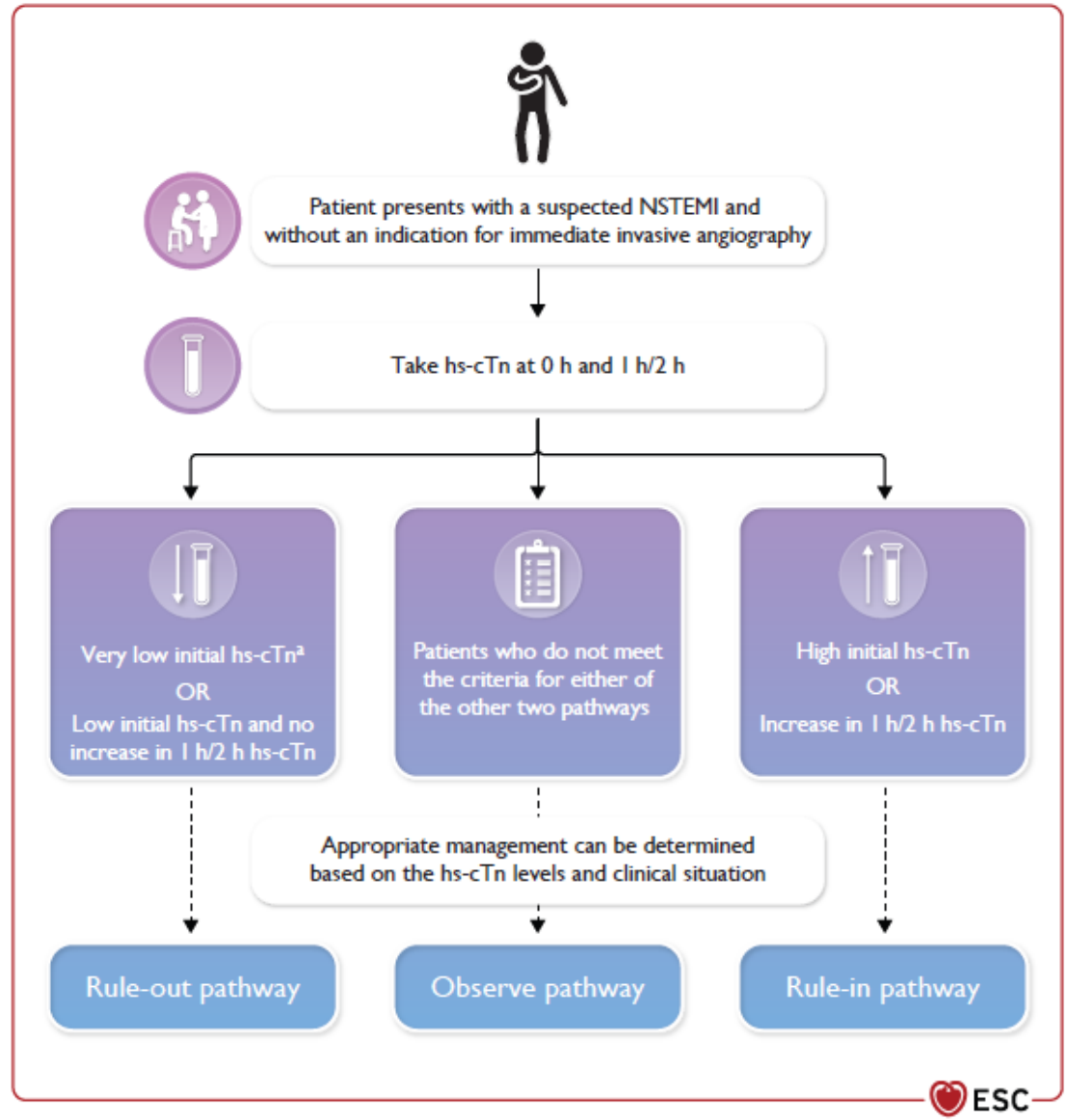


Figure 6 The 0 h/1 h or 0 h/2 h rule-out and rule-in algorithms using high-sensitivity cardiac troponin assays in patients presenting to the emergency department with suspected NSTEMI and without an indication for immediate invasive angiography. hs-cTn, high-sensitivity cardiac troponin; NSTEMI, non-ST-elevation myocardial infarction. Patients are classified into one of three pathways as per the results of their hs-cTn values at 0 h (time of initial blood test) and 1 h or 2 h later. Patients with a very low initial hs-cTn value or patients with a low initial value and no 1 h/2 h change in hs-cTn are assigned to the 'rule-out' pathway. Patients with a high initial hs-cTn value or a 1 h/2 h change in hs-cTn are assigned to the 'rule-in' pathway. Patients who do not meet the criteria for the rule-out or rule-in strategies are assigned to the 'observe' pathway, and these patients should have hs-cTn levels checked at 3 h ± echocardiography in order to decide on further management. Cut-offs are assay specific (see Supplementary material online, *Table S4*) and derived to meet pre-defined criteria for sensitivity and specificity for NSTEMI. Potential management and testing options for each of the three strategies are provided in the relevant sections of the main text.[12–15,26,27,53,55–58,100,101] [a]Only applicable if the chest pain onset was >3 h prior to the 0 h hs-cTn measurement.

ESC European Society of Cardiology
European Heart Journal (2023) 00, 1–107
https://doi.org/10.1093/eurheartj/ehad191

2023 ESC Guidelines for the management of acute coronary syndromes

Developed by the task force on the management of acute coronary syndromes of the European Society of Cardiology (ESC)

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Measurement of a biomarker of cardiomyocyte injury, preferably high-sensitivity cardiac troponin (hs-cTn), is recommended in all patients with suspected ACS.[15,17,25–27,53,54] If the clinical presentation is compatible with myocardial ischaemia, then a rise and/or fall in cTn above the 99th percentile of healthy individuals points to a diagnosis of MI as per the criteria in the fourth universal definition of MI.[1] In patients

Acute myocardial infarction (AMI) defines cardiomyocyte necrosis in a clinical setting consistent with acute myocardial ischaemia.[1,3] A combination of criteria is required to meet the diagnosis of AMI, namely the detection of an increase and/or decrease of a cardiac biomarker, preferably high-sensitivity cardiac troponin (hs-cTn) T or I, with at least one value above the 99th percentile of the upper reference limit and at least one of the following:

(1) Symptoms of myocardial ischaemia.
(2) New ischaemic ECG changes.
(3) Development of pathological Q waves on ECG.
(4) Imaging evidence of loss of viable myocardium or new regional wall motion abnormality in a pattern consistent with an ischaemic aetiology.
(5) Intracoronary thrombus detected on angiography or autopsy.

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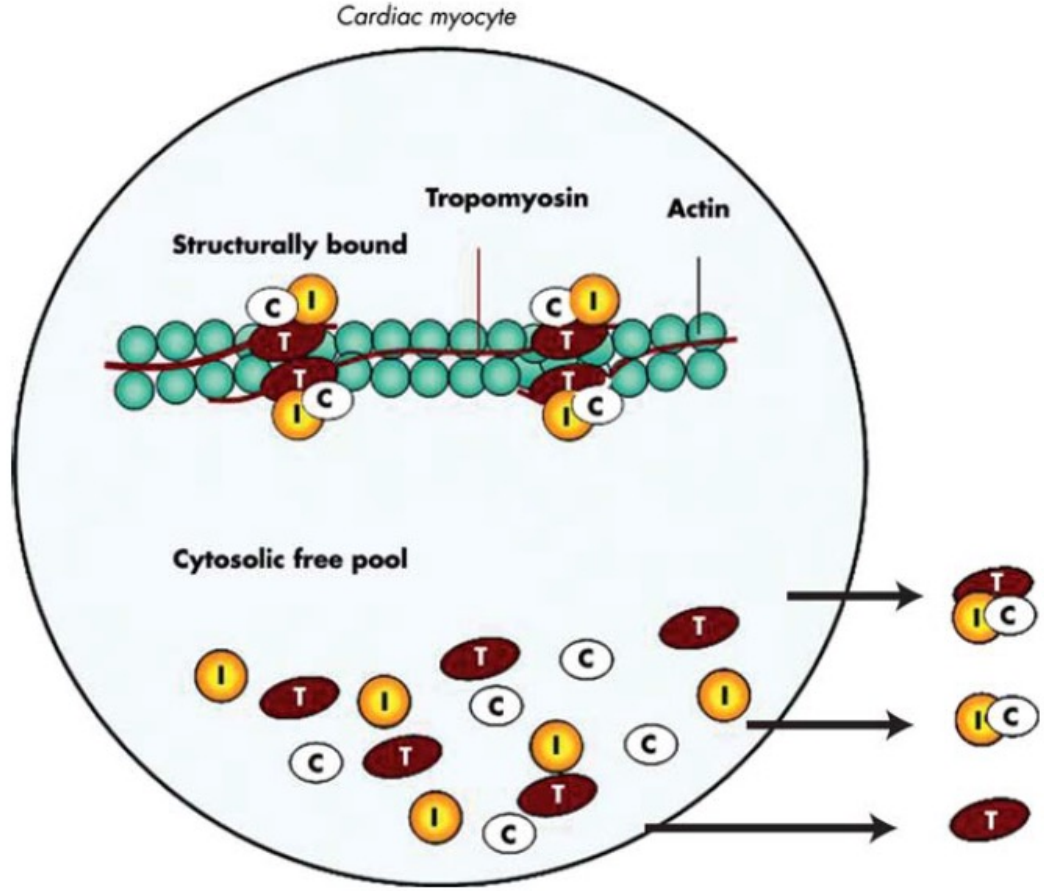
Aucun urgentiste dans les *guidelines* !

La troponine : protéine de structure cardiospécifique non coronaro-spécifique



Marqueur de nécrose myocytaire

Agewall, *Eur Heart J* 2011

En 2024, élévation de cTnHs : IDM type 2 >> IDM1

Table S3 Conditions other than acute Type 1 myocardial infarction associated with cardiomyocyte injury (i.e. cardiac troponin elevation)

Myocardial injury related to acute myocardial ischaemia because of oxygen supply/demand imbalance (Type 2 MI)
Reduced myocardial perfusion, e.g.:
• Coronary artery spasm, microvascular dysfunction
• Coronary embolism
• Non-atherosclerotic coronary artery dissection
• Sustained bradyarrhythmia
• Hypotension or shock
• Respiratory failure
• Severe anaemia
Increased myocardial oxygen demand, e.g.:
• Sustained tachyarrhythmia
• Severe hypertension with or without left ventricular hypertrophy

2/3 des types 2

Other causes of myocardial injury
Cardiac conditions:
• Heart failure
• Myocarditis[a]
• Cardiomyopathy (any type)
• Takotsubo syndrome
• Cardiac contusion or cardiac procedures (CABG, PCI, valvular interventions, ablation, pacing, cardioversion, or endomyocardial biopsy)
Systemic conditions:
• Sepsis, infectious disease
• Chronic kidney disease
• Stroke, subarachnoid haemorrhage
• Pulmonary embolism, pulmonary hypertension
• Infiltrative diseases (e.g. amyloidosis, sarcoidosis, haemochromatosis, scleroderma)
• Myocardial drug toxicity or poisoning (e.g. doxorubicin, 5-fluorouracil, trastuzumab, snake venoms)
• Critically ill patients
• Hypo- and hyper-thyroidism
• Strenuous exercise
• Rhabdomyolysis

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2023 ESC Guidelines for the management of acute coronary syndromes

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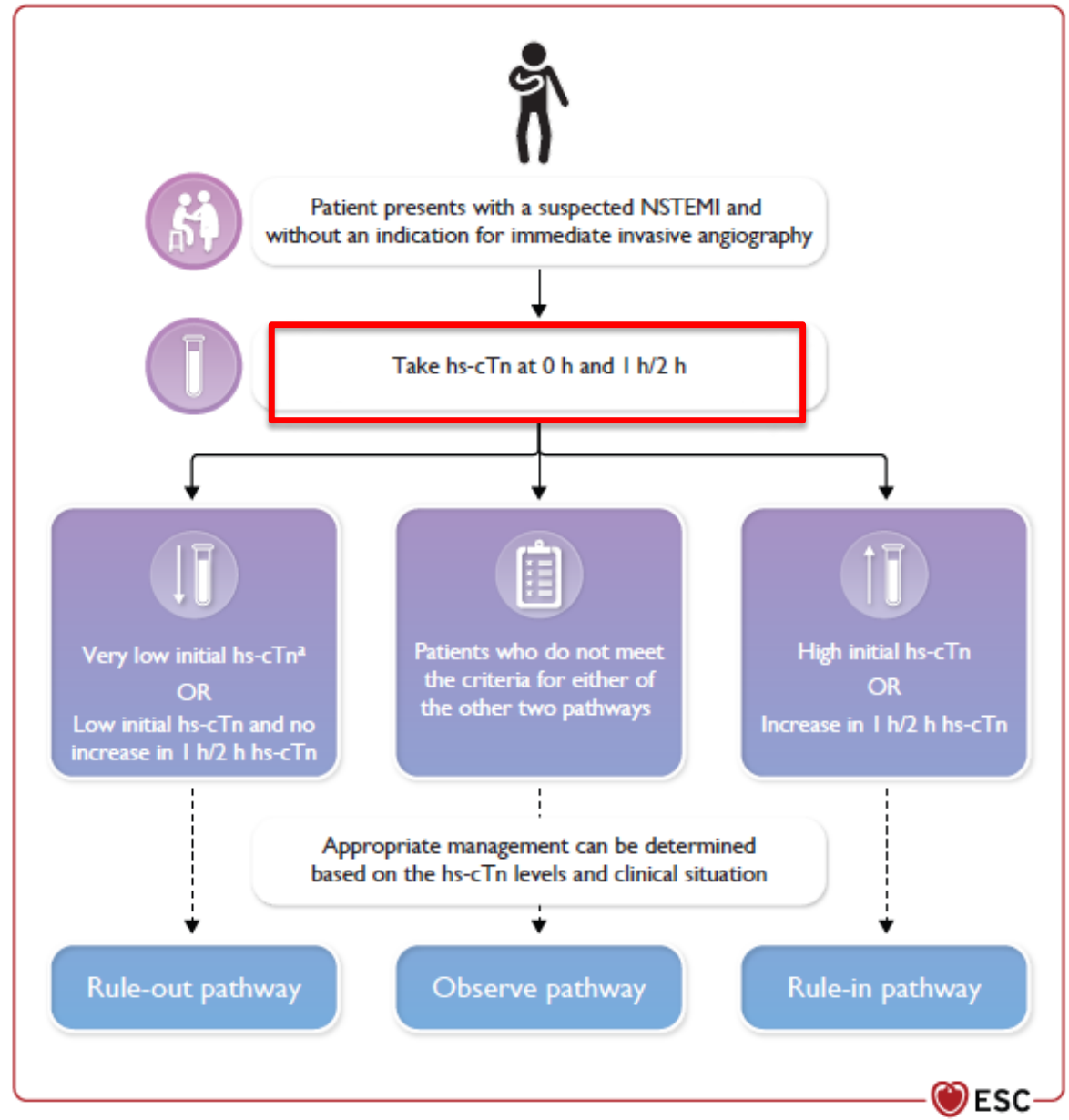
3.3.4. Rapid 'rule-in' and 'rule-out' algorithms

Due to their higher sensitivity and diagnostic accuracy for the detection of MI at presentation, the time interval to the second cTn assessment can be shortened with the use of hs-cTn assays. This substantially reduces the delay to diagnosis, translating into shorter stays in the ED, lower costs, and less diagnostic uncertainty for patients.[15,83–88] It is recommended to use the 0 h/1 h algorithm (best option) or the 0 h/2 h algorithm (second-best option) (*Figure 6*). These algorithms have been derived and validated in large multicentre diagnostic studies using central adjudication of the final diagnosis for all currently available hs-cTn assays.[27–39,62,70,73,82,89–93] Optimal thresholds for rule-out were selected to allow a sensitivity and NPV of at least 99%. Optimal thresholds for rule-in were selected to allow a positive predictive value (PPV) of at least 70%. These algorithms were developed from large derivation cohorts and then validated in large independent validation cohorts. The previous ESC 0 h/3 h algorithm was considered as an alternative,[40,56] but three recent large diagnostic studies suggested that the ESC 0 h/3 h algorithm appears to balance efficacy and safety less well than more rapid protocols using lower rule-out concentrations, including the ESC 0 h/1 h algorithm.[41–43] The very high safety and high efficacy of applying the ESC 0 h/1 h algorithm was recently confirmed in three real-life implementation studies, including one randomized controlled trial (RCT).[44,94,95] Therefore, the ESC 0 h/3 h algorithm is an alternative for cases where the ESC 0 h/1 h or 0 h/2 h algorithms are not available. Of note, patients assigned to the 'rule-out' pathway using the ESC 0 h/1 h or 0 h/2 h algorithms have a very low rate of clinical events through to 30 days.[95,96]



Dosage de la cTnHs aux urgences

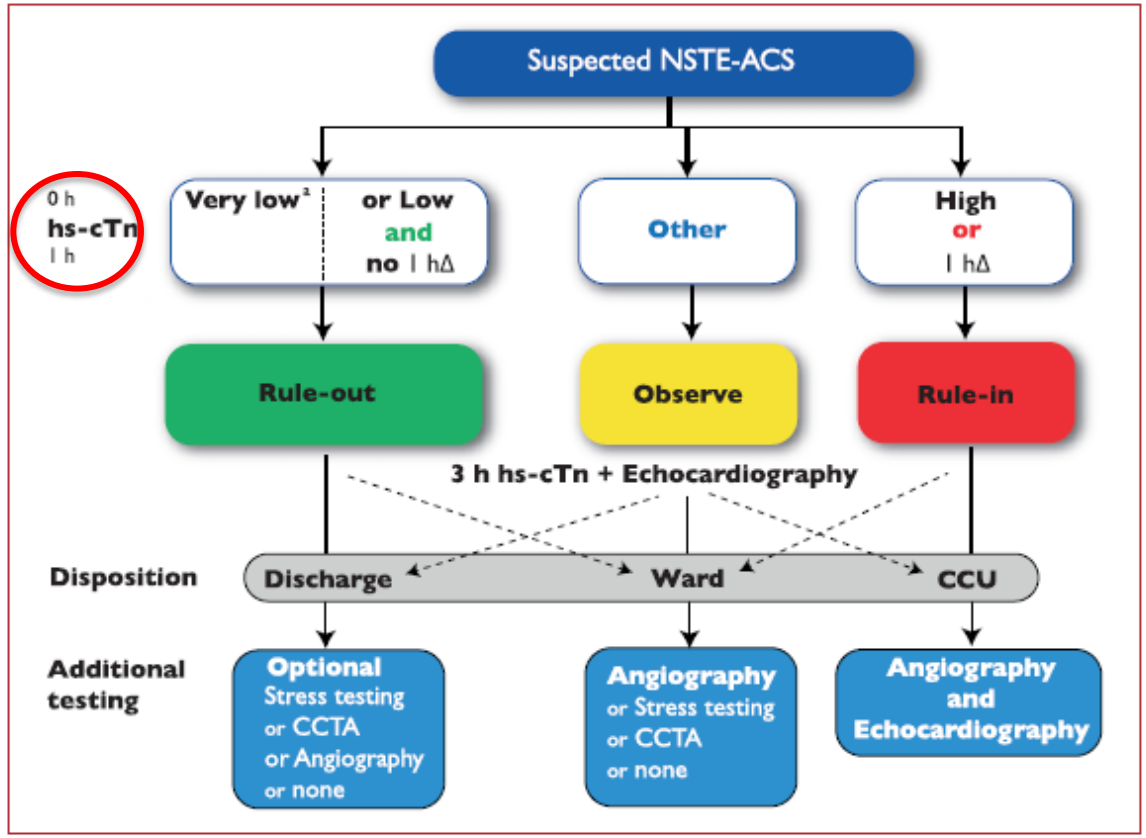


Figure 3 0 h/1 h rule-out and rule-in algorithm using high-sensitivity cardiac troponin assays in haemodynamically stable patients presenting with suspected non-ST-segment elevation acute coronary syndrome to the emergency department. 0 h and 1 h refer to the time from first blood test. NSTEMI can be ruled out at presentation if the hs-cTn concentration is very low. NSTEMI can also be ruled out by the combination of low baseline levels and the lack of a relevant increase within 1 h (no 1hΔ). Patients have a high likelihood of NSTEMI if the hs-cTn concentration at presentation is at least moderately elevated or hs-cTn concentrations show a clear rise within the first hour (1hΔ).[1,6–8,10–13,29–31,33] Cut-offs are assay specific (see *Table 3*) and derived to meet predefined criteria for sensitivity and specificity for NSTEMI. CCU = coronary care unit; CCTA = coronary computed tomography angiography; CPO = chest pain onset; hs-cTn = high-sensitivity cardiac troponin; NSTE-ACS = non-ST-segment elevation acute coronary syndrome; NSTEMI = non-ST-segment elevation myocardial infarction. [2]Only applicable if CPO >3 h. *Listen to the audio guide of this figure online.*

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1. Qu'est ce qu'on dose ?

2. Compliqué !

Table S4 Assay specific cut-off levels in ng/L within the 0 h/1 h and 0 h/2 h algorithms

0 h/1 h algorithm	Very low	Low	No 1 hΔ	High	1 hΔ
hs-cTnT (Elecsys; Roche)	<5	<12	<3	≥52	≥5
hs-cTnI (Architect; Abbott)	<4	<5	<2	≥64	≥6
hs-cTnI (Centaur; Siemens)	<3	<6	<3	≥120	≥12
hs-cTnI (Access; Beckman Coulter)	<4	<5	<4	≥50	≥15
hs-cTnI (Clarity; Singulex)	<1	<2	<1	≥30	≥6
hs-cTnI (Vitros; Clinical Diagnostics)	<1	<2	<1	≥40	≥4
hs-cTnI (Pathfast; LSI Medience)	<3	<4	<3	≥90	≥20
hs-cTnI (TriageTrue; Quidel)	<4	<5	<3	≥60	≥8
hs-cTnI (Dimension EXL; Siemens)	<9	<9	<5	≥160	≥100
0 h/2 h algorithm	**Very low**	**Low**	**No 2 hΔ**	**High**	**2 hΔ**
hs-cTnT (Elecsys; Roche)	<5	<14	<4	≥52	≥10
hs-cTnI (Architect; Abbott)	<4	<6	<2	≥64	≥15
hs-cTnI (Centaur; Siemens)	<3	<8	<7	≥120	≥20
hs-cTnI (Access; Beckman Coulter)	<4	<5	<5	≥50	≥20
hs-cTnI (Clarity; Singulex)	<1	TBD	TBD	≥30	TBD
hs-cTnI (Vitros; Clinical Diagnostics)	<1	TBD	TBD	≥40	TBD
hs-cTnI (Pathfast; LSI Medience)	<3	TBD	TBD	≥90	TBD
hs-cTnI (TriageTrue; Quidel)	<4	TBD	TBD	≥60	TBD

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The cut-offs apply irrespective of age, sex, and renal function. Optimized cut-offs for patients above 75 years of age and patients with renal dysfunction have been evaluated, but not consistently shown to provide better balance between safety and efficacy as compared with these universal cut-offs.[30,31] The algorithms for additional assays are in development: hs-cTn T on Elecsys (Roche), hs-cTn I on Architect (Abbott), hs-cTn I on Centaur (Siemens), hs-cTn I on Access (Beckman Coulter), hs-cTn I on Clarity (Singulex), hs-cTn I on Vitros (Clinical Diagnostics), hs-cTn I on Pathfast (LSI Medience), and hs-cTn I on TriageTrue (Quidel).
hs-cTn, high-sensitivity cardiac troponin; TBD, to be determined.[30,31,67–88]

Exclure un SCA non ST+ en <H0-H1, c'est bien, mais…

Encore faut il avoir :

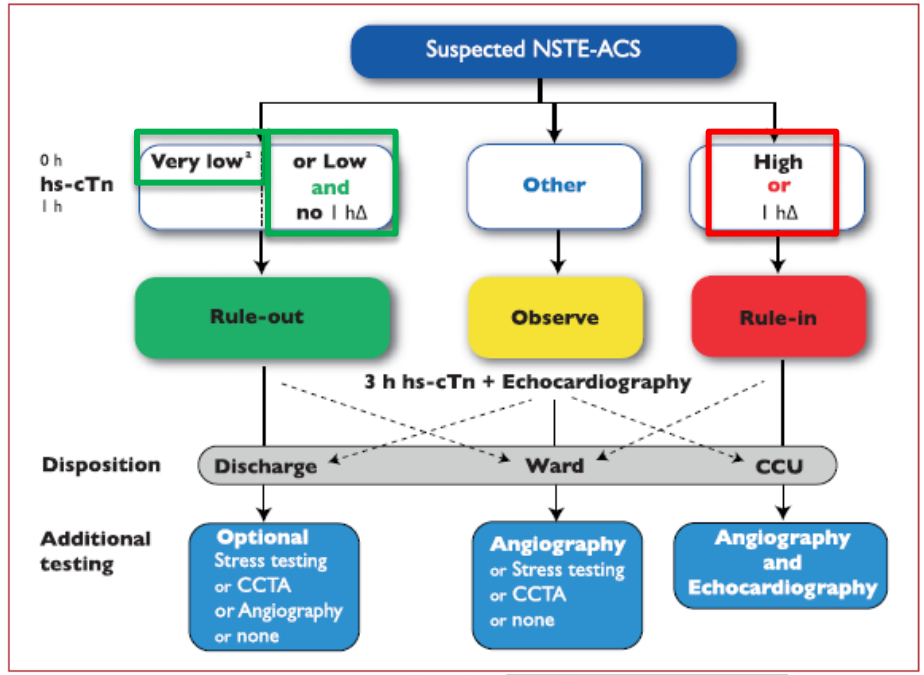
- La certitude du début de la DT

!! Jusqu'à 30% des patients ont une DT <2h !!

- Un peu de recul sur le début de la DT
- Un dosage de troponine avec une méthode hypers ine HS)

- Un résultat de troponine Hs en moins d'une heure
- Les bons seuils d'interprétation

Les valeurs seuils



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hs-cTn I (Pathfast; LSI Medience)	<3	<4	<3	≥90	≥20
hs-cTn I (TriageTrue; Quidel)	<4	<5	<3	≥60	≥8

Casse-tête pour l'urgentiste…

Comment mettre en place le protocole 0-1h ?

- Aspects cliniques

Time to decision = time of blood draw + turnaround time. The use of the ESC 0 h/1 h algorithms is irrespective of the local turnaround time (time from blood draw to blood results); 0 h and 1 h refer to the time points at which blood is taken. The second blood draw may need to be taken before the result from the first one is available (although the results should be available in most cases within 60 min of blood sampling), but this does not affect the interpretation of the algorithms. The clinical and economic benefit of the ESC 0 h/1 h algorithm compared with other algorithms where the second blood draw is later than 1 h is therefore independent of the local turnaround time.[98]

- Aspects Biologiques
  - Méthode de dosage cTnHs
  - Demander systématiquement l'heure de la DT ?
  - Contractualiser avec le service prescripteur
  - Recours à la biologie délocalisée ?
  - Faire H1 sans avoir le résultat de H0 ??

Non-sens pour l'urgentiste…

Questionnement sur les *early presenters*

Etude poolée de NSTEMI

N=160 avec une CPO<2

26-38%
DT <3h

Les performances diagnostiques d'un seul dosage H0 diminuées si DT <2 ou 3h

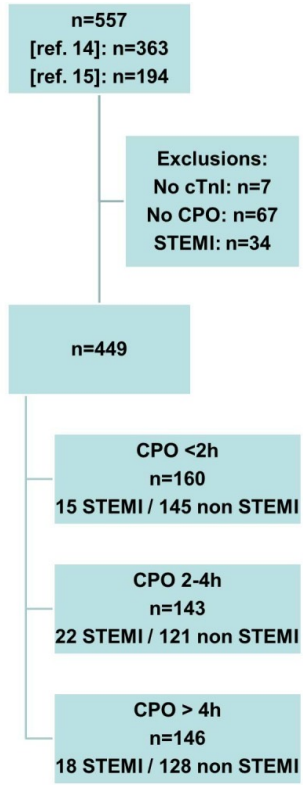


Table 3 AUC values according to CPO category

	Biomarker	AUC	95% CI
CPO <2 hours (very early presenters)	cTnI	0.841	0.775 to 0.894
	cTnI+copeptin	0.880	0.819 to 0.926
	HS-cTnT	0.853	0.789 to 0.904
	HS-cTnT+copeptin	0.897	0.84 to 0.940
CPO 2–4 hours	cTnI	0.886	0.823 to 0.933
	cTnI+copeptin	0.915	0.857 to 0.955
	HS-cTnT	0.869	0.802 to 0.919
	HS-cTnT+copeptin	0.891	0.829 to 0.937
CPO >4 hours	cTnI	0.995	0.965 to 1.000
	cTnI+copeptin	0.979	0.9 to 0.995
	HS-cTnT	0.980	0.942 to 0.996
	HS-cTnT+copeptin	0.953	0.905 to 0.981

AUC, area under the ROC curve; CPO, chest pain onset; cTnI, cardiac troponin I; HS-cTnT, high-sensitivity cardiac troponin T.

Dans cette étude, les NSTEMI non diagnostiqués sont TOUS des « *very early presenters* »

Chenevier-Gobeaux *BMJ Open* 2019

3
9

Table 2 Overview on the performance of fast rule-out strategies based on single and serial blood draw at 0 hour/1 hour

	Test principle	Company	Meta-analysis cohorts	Troponin (ng/L)	Sensitivity (pooled)	NPV (pooled)	Proportion eligible for rule-out	Event rate after rule-out		
								MACE	Death	MI
0-hour rule-out: single hs-cTNT <LoD (SMS)										
Pickering, *et al*[29]	hs-cTnT		11 cohorts 9241 patients	<LoD (<5 ng/L)	98.7% (96.6 to 99.5)	99.3% (97.3 to 99.8)	30.60%	21/8059	1.30%	14/8059
ESC 0/1 hour: either very low 0 hour <LoD or low hs-cTn *and* small δ between 0 and 1 hour										
Chiang, *et al*[28] 15 cohorts: 11 014 patients	hs-cTnI	Abbott	4 cohorts	Either very low 0 hour (<2 ng/L), or low hs-cTnI (<5 ng/L) and small δ (<2 ng/L) between 0 and 1 hour	98.1% (94.6 to 99.3)	99% (96.0 to 100)	50.00%	NA	0.10%	NA
	hs-cTnI	Siemens	4 cohorts	Either very low 0 hour (<0.5 ng/L), or low hs-cTnI (<5 ng/L) and small δ (<2 ng/L) between 0 and 1 hour	98.7% (97.3 to 99.3)	100% (99 to 100)	51.00%	NA	0.10%	NA
	hs-cTnT	Roche	7 cohorts 7744 patients	Either very low 0 hour (<5 ng/L), or low hs-cTnT (<12 ng/L) and small δ (<3 ng/L) between 0 and 1 hour	98.4% (95.1 to 99.5)	99.6% (99.0 to 99.9)	55.00%	NA	0.10%	NA

ESC, European Society of Cardiology; hs-cTnI, high-sensitivity cardiac troponin I; LoD, limit of detection; MACE, major adverse cardiac events; MI, myocardial infarction; NA, not available; NPV, negative predictive value; SMS, single marker strategy.

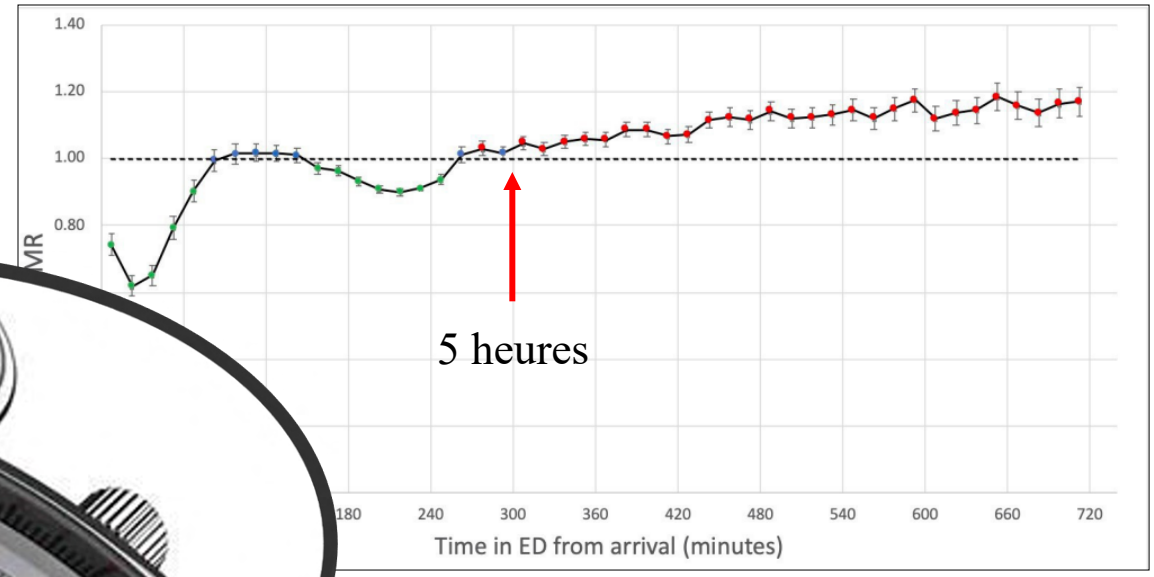
Intérêt des troponines POCT ?

- C’est quoi, « POCT » ?
- Ce qu’il faut savoir sur la cTn avant de la prescrire
- La troponine en POC, Oui mais… Pour quoi faire ?

Association between delays to patient admission from the emergency department and all-cause 30-day mortality

Simon Jones [1,2] Chris Moulton [3,4] Simon Swift [2,5] Paul Molyneux [2]
Steve Black [6] Neil Mason [2] Richard Oakley [2] Clifford Mann [3,7]

Jones S *J Emerg Med J* 2022



Research

JAMA Internal Medicine | Original Investigation

Overnight Stay in the Emergency Department and Mortality in Older Patients

Melanie Roussel, MD; Dorian Teissandier, MD; Youri Yordanov, MD, PhD; Frederic Balen, MD; Marc Noizet, MD; Karim Tazarourte, MD, PhD; Ben Bloom, MD, PhD; Pierre Catoire, MD; Laurence Berard, MD; Marine Cachanado, MSc; Tabassome Simon, MD, PhD; Said Laribi, MD, PhD; Yonathan Freund, MD, PhD; for the FHU IMPEC–IRU SFMU Collaborators

IMPORTANCE Patients in the emergency department (ED) who are waiting for hospital admission on a wheeled cot may be subject to harm. However, mortality and morbidity among older patients who spend the night in the ED while waiting for a bed in a medical ward are unknown.

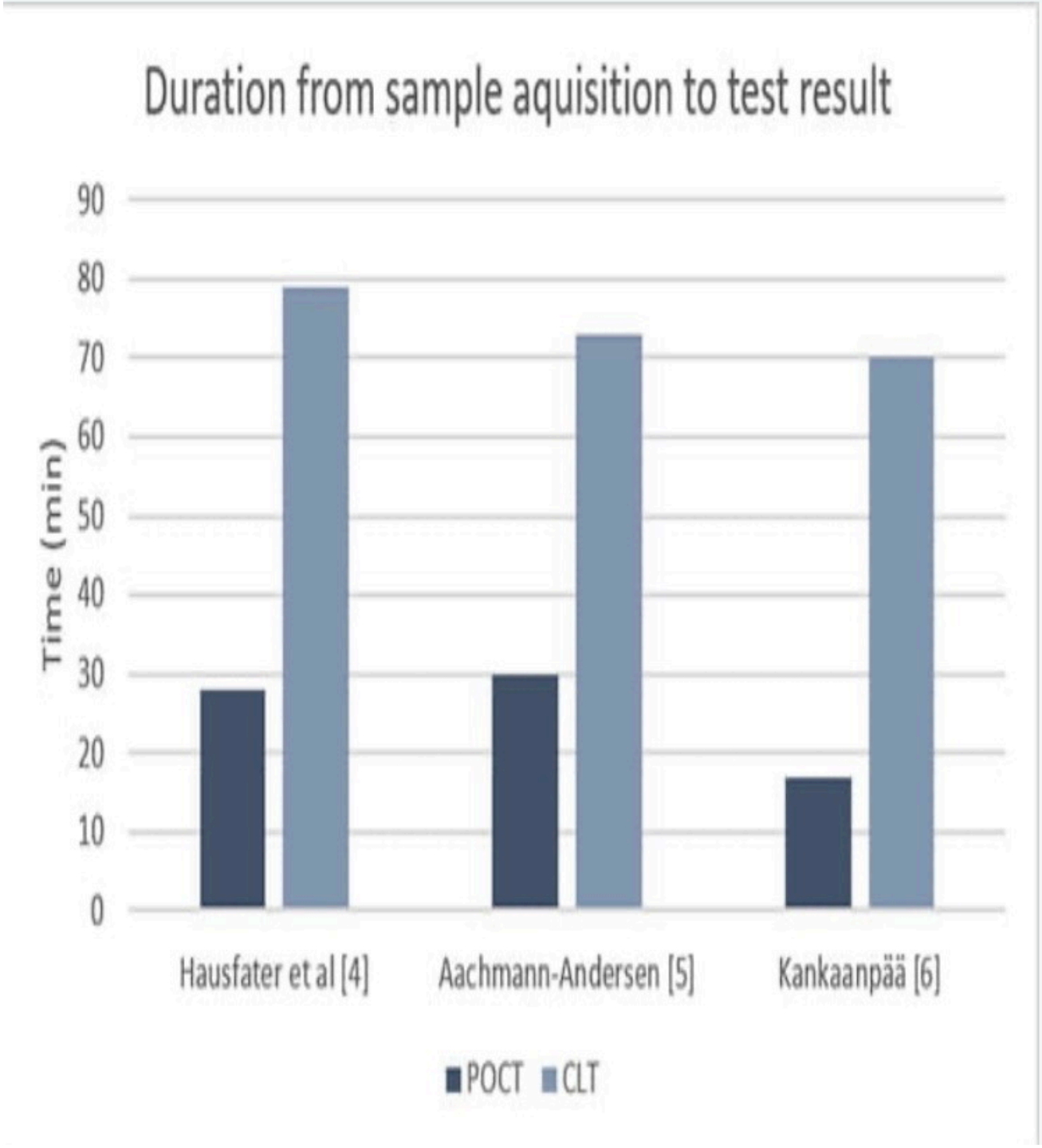
OBJECTIVE To assess whether older adults who spend a night in the ED waiting for admission to a hospital ward are at increased risk of in-hospital mortality.

Invited Commentary
Supplemental content

Résultats (TAT) plus rapidement disponibles

≠ décision plus rapide

≠ DMS raccourcie



DMS totale en SU

De l'arrivée au médecin

Du médecin à la décision

De la décision au départ

Environ 60% des patients avec bio
Bio augmente la DMS de 72 min
et TDM de 59 min

- Arrivée du patient
- Identification
- Début du triage
- Fin du triage
- Mise en salle d'examen
- Premier contact médical
- Demande paracliniques
- Fin résultats paracliniqu
- Synthèse médicale
- Décision médicale
- Demande hospitalisation
- Disponibilité de place
- Départ de SU en service

TAT

Installation du patient

Obtention examens

Réflexion

Attente hospitalisation ou « *boarding* »

Intervalle de temps les plus variables en fonction de l'organisation institutionnelle

Kocher *AcadEmergMed* 2012
Claret Thèse de sciences 2016

Biologie d'urgence délocalisée

Avantages :

- Rapidité H0-H1
- Orientation
- Traitement
- Economie de soin ?

Inconvénients vs labo :

- Surcout du budget labo
- Glissement de tâche
- Entretien de l'analyseur
- Panel d'analyses restreint
- Précision analytique
- Maîtrise pré-analytique ?
- Sur-prescription

Secteur en très fort développement
Money++++ vs. modifications des structures d'urgence en France
Innovations +++
Méthodes de ++ performantes : Rapidité, sensibilité, précision
… mais : attention aux surcoûts + transfert de tâche + création de labo

Point-of-care testing with high-sensitivity cardiac troponin assays: the challenges and opportunities

Louise Cullen ,[1] Paul O Collinson ,[2] Evangelos Giannitsis[3]

Table 1 Performance characteristics of POCT troponin assays[8 16 18]

Assay	Platform	Company	Concentration at 10% CV	Specimen type	99th percentile	Per cent normals measured ≥LoD	Assay type/ device
hs-cTnI	Atellica VTLi	Siemens	6,7 ng/L (plasma) 8,9 ng/L (sang total)	Li-heparin plasma	Overall: 23 ng/L F: 18 ng/L M: 27 ng/L	Overall: 83.7% F: 79.7% M: 87.3%	hs; cds
	PATHFAST	LSI Medience (formerly Mitsubishi)	15 ng/L	Heparin-Na, heparin-Li or EDTA whole blood or plasma	Overall: 27.9 ng/L F: 20.3 ng/L M: 29.7 ng/L	Overall: 66.3% F: 52.8% M: 78.8%	
hs-cTnI		Quidel/Alere	4.4–8.4 ng/L (plasma) 5.8–6.2 ng/L (whole blood)	EDTA whole blood or plasma	Overall: 20.5 ng/L F: 14.4 ng/L M: 25.7 ng/L	Overall: ≥50%	

Table 3 Results from diagnostic accuracy studies of POCT hs-cTn assays at presentation for the diagnosis of AMI

POC assay	AUC (95% CI)	Comparator assay	AUC (95% CI)	Patients	AMI rate
PATHFAST POC hs-cTnI[7] (plasma)	0.91 (0.89 to 0.93)	cTnI-Architect (fresh serum or plasma)	0.90 (0.87 to 0.92)	1279	134 (20%)
I-STAT TnI-Nx[20] * (plasma)	0.97 (0.96 to 0.99)	cTnI-Architect (plasma)	0.97 (0.95 to 0.99)	354	57 (16%)
Minicare POC hs-cTnI[9] (whole blood)	0.88 (0.83 to 0.94)	cTnI-Architect (serum or plasma)	0.91 (0.87 to 0.95)	450	72 (16%)
		I-Stat POC cTnI	0.88 (0.82 to 0.94)		
Triage True POC hs-cTnI[6] (plasma)	0.95 (0.93 to 0.96)	cTnT Elecsys (serum or plasma)	0.94 (0.93 to 0.96)	1261	178 (14%)
		cTnI-Architect (serum or plasma)	0.92 (0.90 to 0.93)		

*Analytical studies of this assay are pending.
AMI, acute myocardial infarction; AUC, area under the curve; hs-cTnI, high-sensitivity cardiac troponin I; POCT, point-of-care test.

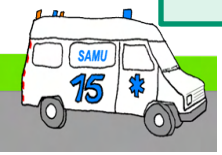
Intérêt du POCT dans la suspicion de SCA en France

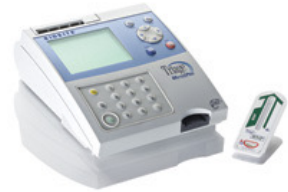
SMUR ?

Traitement plus précoce

Orientation directe en cardiologie

Laisser plus de patient à domicile





IDM

Urgences ?

Traitement plus précoce

Orientation plus rapide en cardiologie

Laisser sortir plus rapidement les patients

cTnHs en préhospitalier

Quelques règles à respecter... :

- Utiliser un algorithme validé = HEART + *pathway*
- POCT en SMUR = même POCT SAU/USIC
- Systèmes de dosages reliés au laboratoire central
- Méthode de dosage HS : seuils validés sur sang total
- Pas si la DT < 3h ET pas de dosage H0 seul

- Etudes interventionnelles positives en France

En 2024, élévation de cTnHs : IDM type 2 >> IDM1

Table S3 **Conditions other than acute Type 1 myocardial infarction associated with cardiomyocyte injury (i.e. cardiac troponin elevation)**

Myocardial injury related to … because of oxygen …
Reduced …
…
…
…
…
…
… failure
Severe anaemia
Increased myocardial oxygen demand, e.g.:
• Sustained tachyarrhythmia
• Severe hypertension with or without left ventricular hypertrophy

NSTEMI : le prétraitement antiplaquettaire non recommandé

Le prétraitement antiplaquettaire systématique par inhibiteurs de P2Y12 (clopidogrel, ticagrélor et prasugrel) n'est pas recommandé dans le NSTEMI, tant que l'anatomie coronaire n'est pas connue (Classe III).

Longtemps recommandée, l'utilisation en routine du prétraitement a été dégradée en 2020, après la publication de plusieurs études rapportant davantage de complications hémorragiques. D'autres résultats sont venus depuis confirmer l'absence de bénéfice, levant au passage les derniers doutes sur son potentiel intérêt.

Montalescot ACOAST *NEJM* 2013

ESC *guidelines* 2023

Intérêt du POCT dans la suspicion de SCA en France

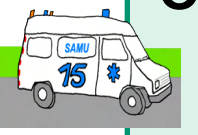
SMUR

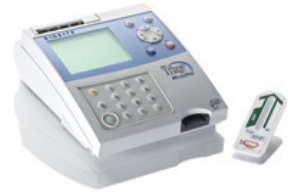
Traitement plus précoce : **NON, rule-out +++**

Orientation directe en cardiologie : **NON**

Laisser plus de patient à domicile : **OUI** …Mais, ailleurs qu'en France

Adapté : +/- **NON**





IDM

Urgences ?

Traitement plus précoce

Orientation plus rapide en cardiologie

Laisser sortir plus rapidement les patients

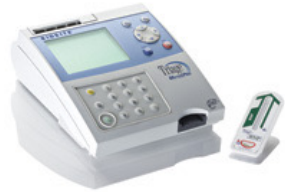
Intérêt du POCT dans la suspicion de SCA en France

SMUR

Traitement plus précoce : **NON, rule-out +++**

Orientation directe en cardiologie : **NON**

Laisser plus de patient à domicile : OUI …ailleurs qu'en France



IDM

Urgences ?

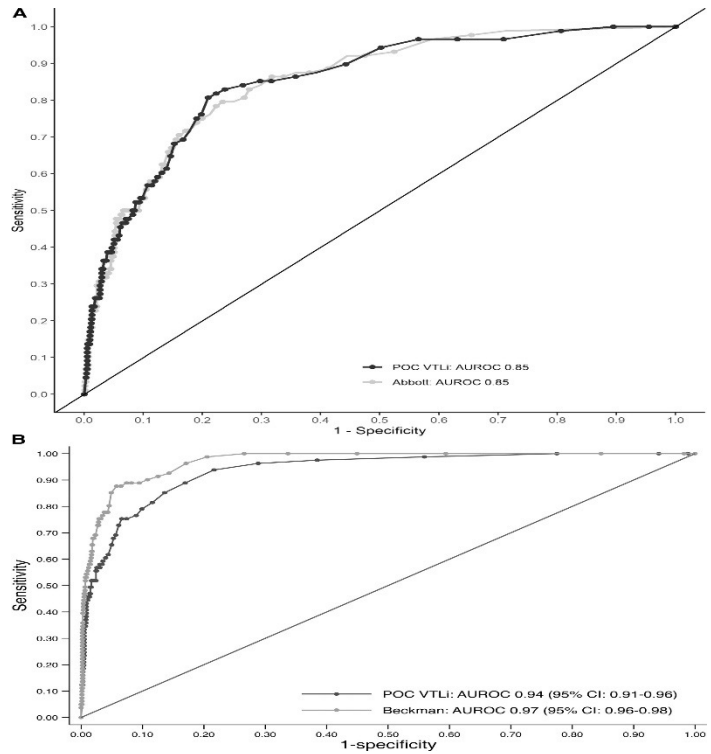
Traitement plus précoce

Orientation plus rapide en cardiologie

Laisser sortir plus rapidement les patients

POCT au SAU

- Efficacités analytiques confirmées
- Pas forcément de gain de temps !



IDM : 8,1%
1 seul dosage < 4 ng/L
VPN de 99.8%

Apple *Circulation* 2022
Boeddinghaus *JAmCollCardiol* 2020
Collinson *Heart* 2012
Ryan *AnnEmergMed* 2009

Impact of Point-of-care Testing on Length of Stay of Patients in the Emergency Department: A Cluster-randomized Controlled Study

ACADEMIC EMERGENCY MEDICINE 2020

Conclusions: The implementation of an extended panel of POCT solutions in an ED did not significantly reduce the LOS, but reduced the TTR.

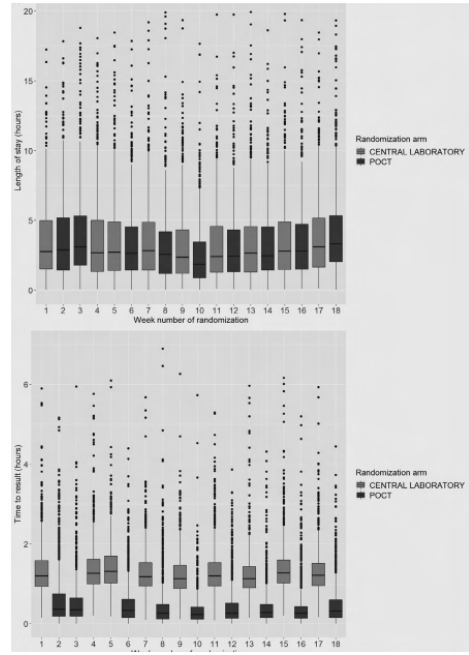


Table 2
Detailed Costs of the Two Strategies, POCT, and Central Laboratory

	Cost per ED Visit (€)	
	POC Strategy	Central Laboratory Strategy
Analyzers operating costs	9.7	0
Costs of the ED personnel	18.3	18.1
Laboratory charges induced by the ED	0.9	6.1
Gross direct costs	29.3	29.3
Induced charges of imaging, functional exploration, anesthesiology, and operating theater	23.1	23.1
Subcontracting costs	1.3	1.3
Total	82.5	77.9

Bonne satisfaction des patients

Bonne satisfaction du labo et du SAU

Conceptuellement ?

Take away messages

- Système de la MU particulier vs. autres pays
- Et qui évolue…
- cTn Hs largement diffusée
- Algorithmes mal adaptés pour le SU français
- Besoins +/- différents en POCT : quel objectif ?
- Etudes randomisées françaises encore en attente